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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/782,029	02/14/2001	Jae-Ho Moon	P56310	8245

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EXAMINER

HUFFMAN, JULIAN D

ART UNIT	PAPER NUMBER
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2853

DATE MAILED: 01/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/782,029

Applicant(s)

MOON ET AL.

Examiner

Julian D. Huffman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 December 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2,3,6,9,23-25,27,36 and 37 is/are pending in the application.
- 4a) Of the above claim(s) 23-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2,3,6,9,27,36 and 37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 February 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. The finality of the last office action is withdrawn.

Election/Restrictions

2. Applicant's argument that claim 27 is a linking claim and therefore claims 23-25 should be rejoined has been considered but is respectfully not found persuasive. Claim 27 has been rejected under new art which was not previously known to the examiner, and thus is no longer allowable. Additionally, claim 27 is not a linking claim. Process claims 23-25, which do not depend from or otherwise include all the limitations of the allowable product, have NOT been rejoined.

Claims 23-25 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 6.

Claim Objections

3. Claim 36 is objected to because of the following informalities:

Claim 36 includes the limitation of each chamber-orifice hole having... a conical shaped portion on a side of said nozzle plate opposite from where said nozzle plate attaches to said front surface of said substrate. However, as seen in fig. 21, the side

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opposite the front surface of the substrate has a cylindrical shaped portion and the conical shaped portion protrudes through the substrate. Thus the conical shape portion is not on the side of the nozzle plate opposite from the front surface of the substrate but rather protrudes through the nozzle plate.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 37 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The limitation that the cylindrical shaped portion is perpendicular to the front surface of the substrate is not clear.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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7. Claims 2, 6, 9, 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsutomu (JP 404161340 A) in view of Bassous et al. (U.S. 3,949,410).

Tsutomu discloses an ink-jet printhead comprising:

a substrate (2), said substrate, having a rear surface, said rear surface having a channel (7) having a predetermined depth, wherein a plurality of ink feed holes are formed on a bottom of the channel perforating said substrate (element 7, a plurality of nozzles are formed on the head, as seen in fig. 7, and a channel is provided for each nozzle);

a nozzle plate coupled to a front surface of the substrate (3), said nozzle plate being perforated by a plurality of chamber-orifice complex holes (8), wherein each chamber-orifice complex hole corresponds to at least one of said plurality of ink feed holes (fig. 1);

a plurality of heaters disposed on the front surface of the substrate (10), each one of said plurality of heaters being located near corresponding ones of said plurality of chamber-orifice complex holes (fig. 1), wherein each one of said plurality of ink feed holes is formed at a center portion of a corresponding one of said plurality of chamber-orifice complex holes (fig. 1), and each one of said plurality of said heaters surrounds corresponding ones of said plurality of ink feed holes (abstract);

wherein each chamber-orifice has a truncated conical shape, wherein a lower end of said chamber orifice facing said substrate faces the corresponding ink feed hole

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and heater formed on the substrate and the other end having a smaller diameter faces toward an outside of said ink-jet printhead (fig. 1).

wherein said substrate comprises two channels in parallel with each other (element 7, a plurality of nozzles are formed on the head, as seen in fig. 7, and a channel is provided for each nozzle);

said nozzle plate being a single integrated monolithic and homogenous unit, each chamber-orifice hole having a cylindrical shaped portion on a side of said nozzle plate where said nozzle plate attaches to said front surface of said substrate and a conical shaped portion (fig. 1, the chamber-orifice hole is cylindrical on the side which connects to the substrate and the sides are graduated as the chamber walls progress towards the opposite side of the nozzle plate);

said cylindrical shaped portion of each chamber-orifice hole being perpendicular to said front surface of said substrate (fig. 1).

Tsutomu does not expressly disclose the substrate being made of silicon.

However, Bassous et al. disclose the use of a silicon substrate (abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the substrate of Tsutomu of silicon, as taught by Bassous et al. The reason for performing the modification would have been to enable the use of fabrication technology compatible with present day integrated circuit processing procedures utilizing semiconducting silicon (column 2, lines 46-48), allowing control circuitry to be integrated on the same substrate (column 12, lines 61-65) and enabling

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the individual jets to be addressed separately and controlled separately (column 13, lines 10-13).

8. Claims 3 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsutomu in view of Bassous et al. and Abe et al.

Tsutomu discloses an ink-jet printhead comprising:

a substrate (2), said substrate, having a rear surface, said rear surface having a channel (7) having a predetermined depth, wherein a plurality of ink feed holes are formed on a bottom of the channel perforating said substrate (element 7, a plurality of nozzles are formed on the head, as seen in fig. 7, and a channel is provided for each nozzle);

a nozzle plate coupled to a front surface of the substrate (3), said nozzle plate being perforated by a plurality of chamber-orifice complex holes (8), wherein each chamber-orifice complex hole corresponds to at least one of said plurality of ink feed holes (fig. 1);

a plurality of heaters disposed on the front surface of the substrate (10), each one of said plurality of heaters being located near corresponding ones of said plurality of chamber-orifice complex holes (fig. 1), wherein each one of said plurality of ink feed holes is formed at a center portion of a corresponding one of said plurality of chamber-orifice complex holes (fig. 1), and each one of said plurality of said heaters surrounds corresponding ones of said plurality of ink feed holes (abstract); and

a first and a second plurality of signal lines terminating near at least one of the ink feed holes (inherent to provide power and ground connections to enable control of the heating element).

With regards to the method steps in claim 27, the patentability of a product does not depend on its method of production (see MPEP 2113).

Tsutomu discloses everything claimed with the exception of the heater being omega in shape and the substrate being made of silicon.

However, Bassous et al. disclose the use of a silicon substrate (abstract) and Abe et al. disclose an omega shaped heater (fig. 17c).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the substrate of Tsutomu of silicon, as taught by Bassous et al. and to replace the heater of Tsutomu with the heater of Abe et al. The reason for performing the modifications would have been to enable the use of fabrication technology compatible with present day integrated circuit processing procedures utilizing semiconducting silicon (Bassous et al., column 2, lines 46-48), allowing control circuitry to be integrated on the same substrate (Bassous et al., column 12, lines 61-65), enabling the individual jets to be addressed separately and controlled separately (Bassous et al., column 13, lines 10-13) and improving the lifetime of the head by reducing cavitation damage to the heating element (Abe et al., column 14, lines 20-40).

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Response to Arguments

9. Applicant's arguments are moot in view of the new ground(s) of rejection.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julian D. Huffman whose telephone number is (703) 308-6556. The examiner can normally be reached on Monday through Friday from 9:30 a.m. to 6:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow, can be reached at (703) 308-3126. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7722. Faxes requiring the immediate attention of the examiner may be sent directly to the examiner at (703) 746-4386. Note that this number will not automatically send a confirmation that the fax was received.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


JH

8 January 2003



Huan Tran
Primary Examiner